Preston Area Watershed Study: Harbour East – Marine Drive Community Council Presentation

AECOM

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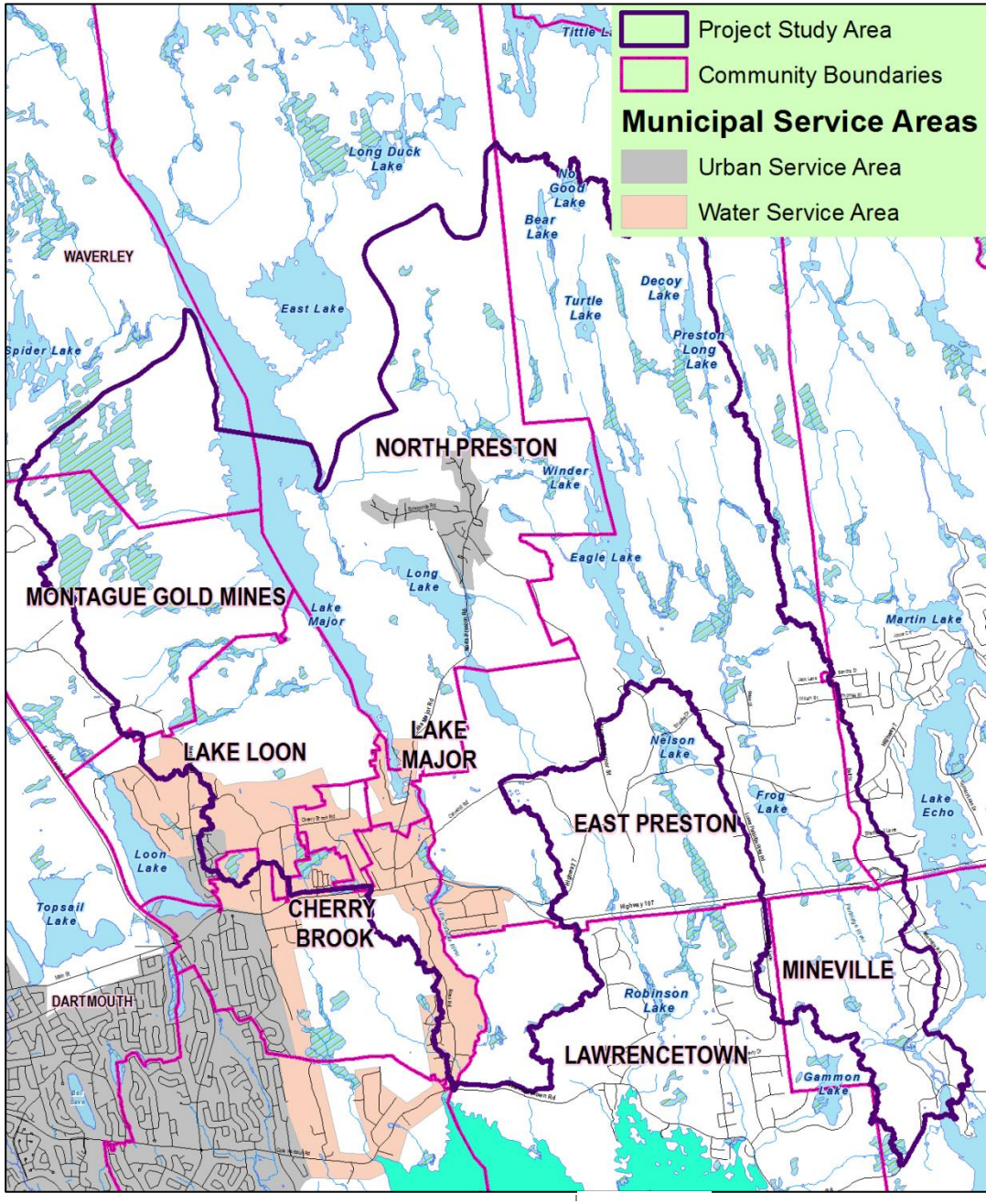
December 4, 2014

Preston Area Watershed Study

- Study summary
  - Objectives
  - Results
- Community comments



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Study Objectives

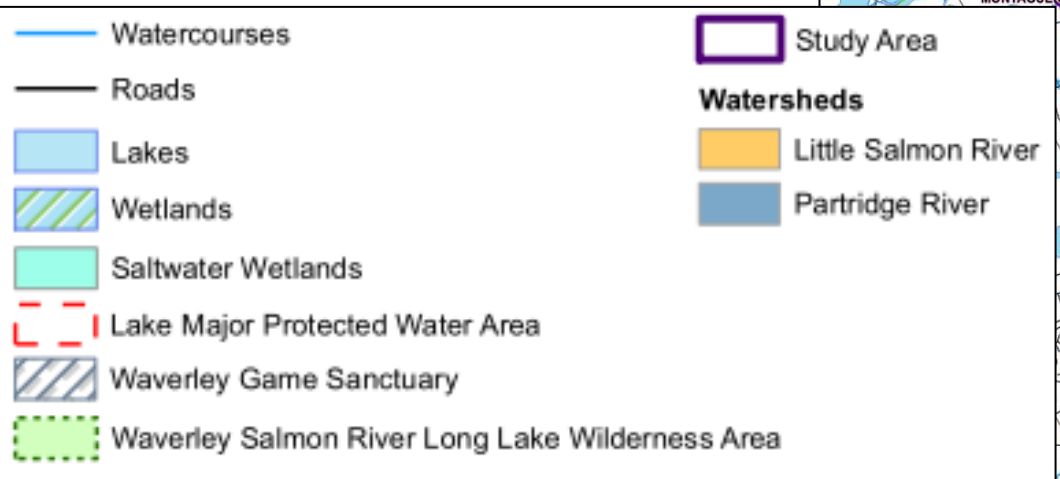
1. Identify environmentally sensitive areas
2. Assess surface water quality
3. Assess groundwater resources

Study Methods

1. Compile existing information
2. Historical data and lake water sampling
3. Residential well survey

Watersheds and Protected Areas

- Salmon River watershed
- Partridge River watershed
- Protected Water Area
- Game Sanctuary
- Wilderness Area



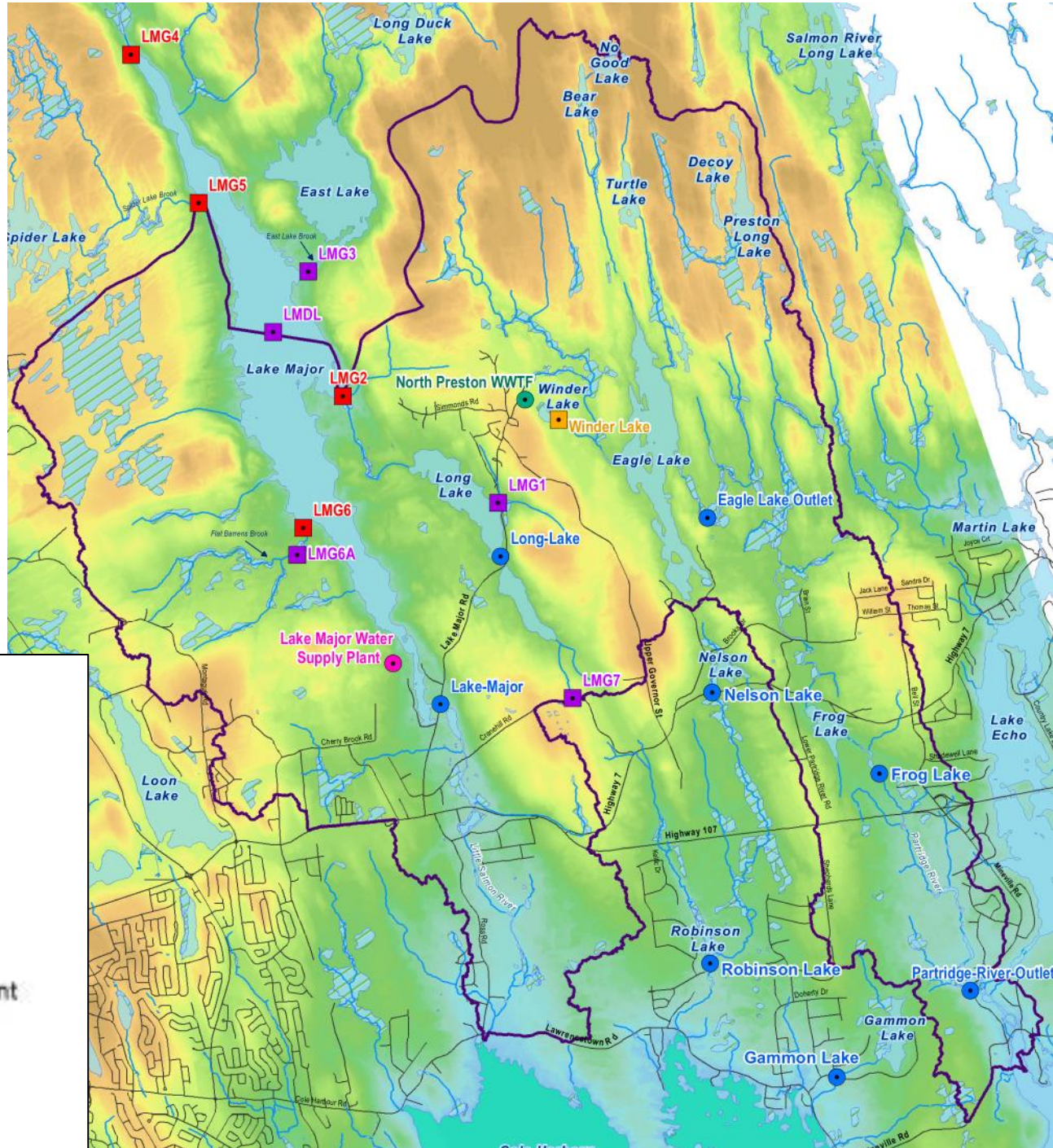
Surface Water Quality Sampling

Lake Major, Long Lake, Eagle Lake and Partridge River

- Aug, Nov 2013,
- May 2014

Nelson Lake, Frog Lake, Gammon Lake and Robinson Lake

- May and July 2014



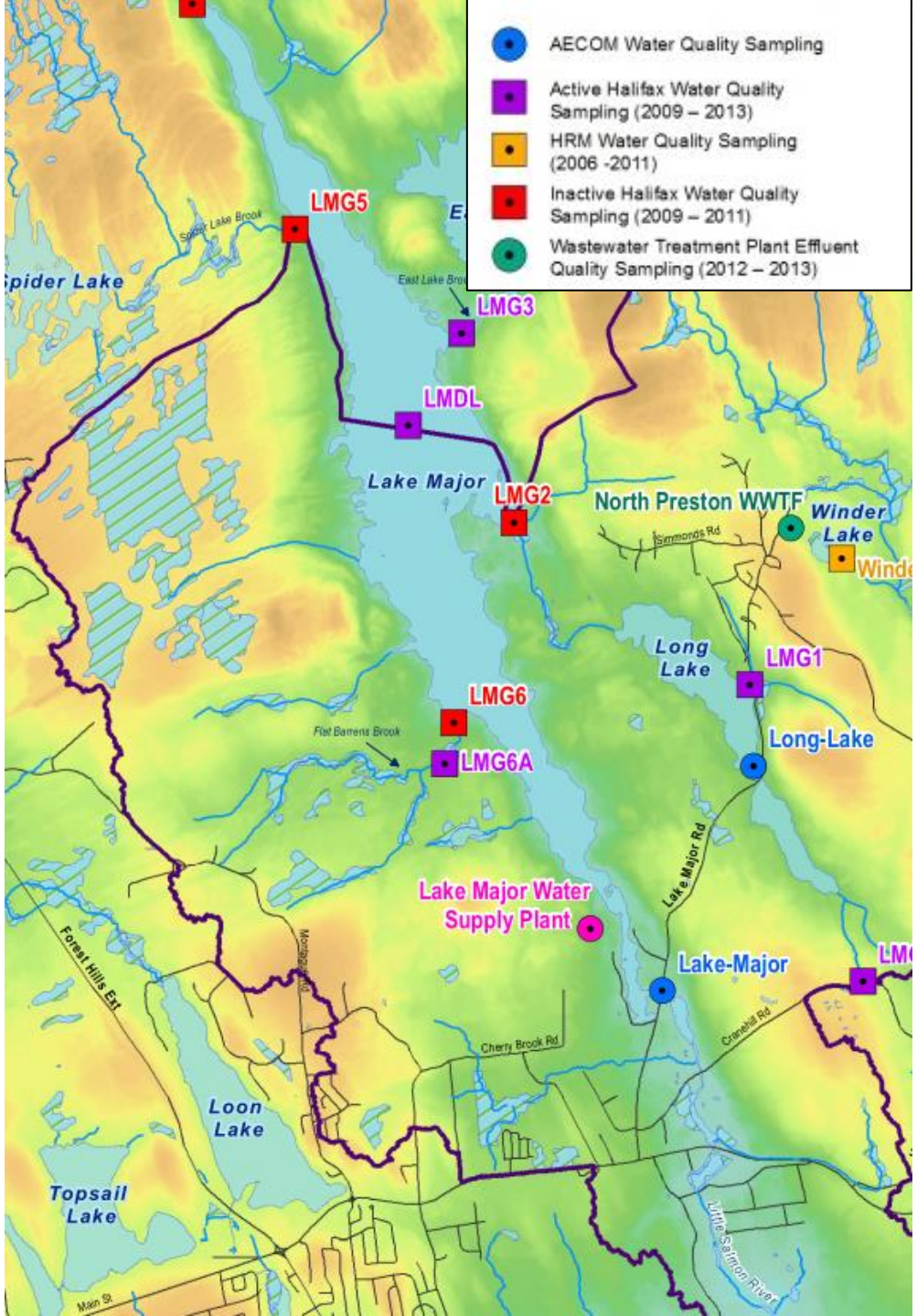
General Water Quality:
Trophic Status (Nutrient Status or "Productivity")

	Trigger Ranges for Total Phosphorus (µg/L)
Trophic level	Lakes and Rivers
Ultra-oligotrophic	<4
Oligotrophic	4-10
Mesotrophic	10-20
Meso-eutrophic	20-35
Eutrophic	35-100
Hyper-eutrophic	>100

Source: CCME Canadian Guidance Framework for the Management of Phosphorus in Freshwater Systems, 2004

Salmon River Watershed

- Lake Major
  - Total phosphorus: 2 to 7 µg/L
  - ***Oligotrophic***
- Long Lake
  - Total phosphorus: 2 to 34 µg/L; median 17 µg/L
  - ***Mesotrophic***



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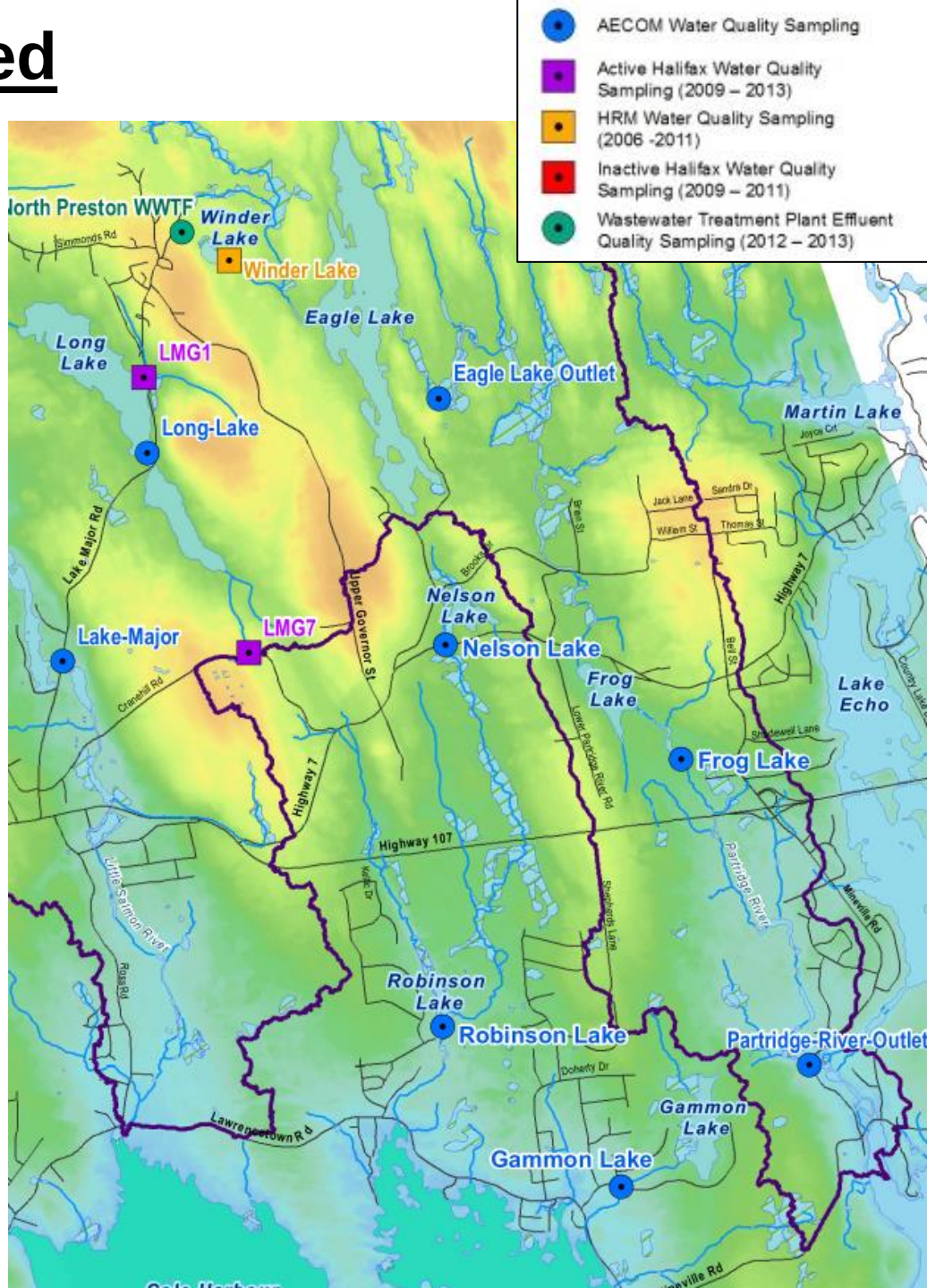
Partridge River Watershed

- **Winder (Whynder) Lake (n=17)**
  - Total Phosphorus: 100 to 300 µg/L (median 100 µg/L) **Eutrophic**
- **Eagle Lake (n=3)**
  - Total Phosphorus: 15, 27, 20 µg/L **Meso-eutrophic**
- **Frog Lake (n=2)**
  - Total Phosphorus: 23, 33 µg/L **Meso-eutrophic**
- **Partridge River Outlet (n=3)**
  - 15, 15, 21 µg/L **Mesotrophic**



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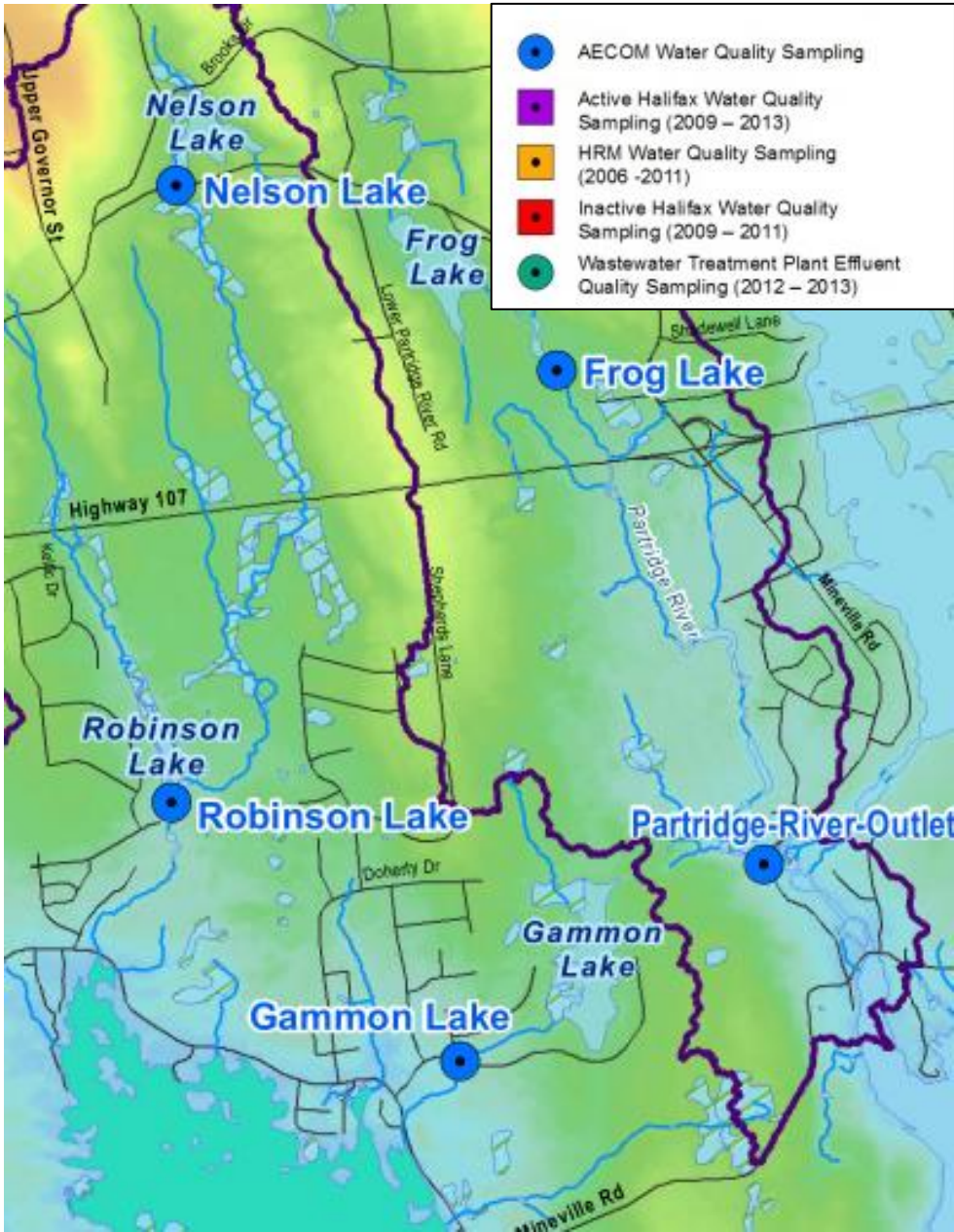
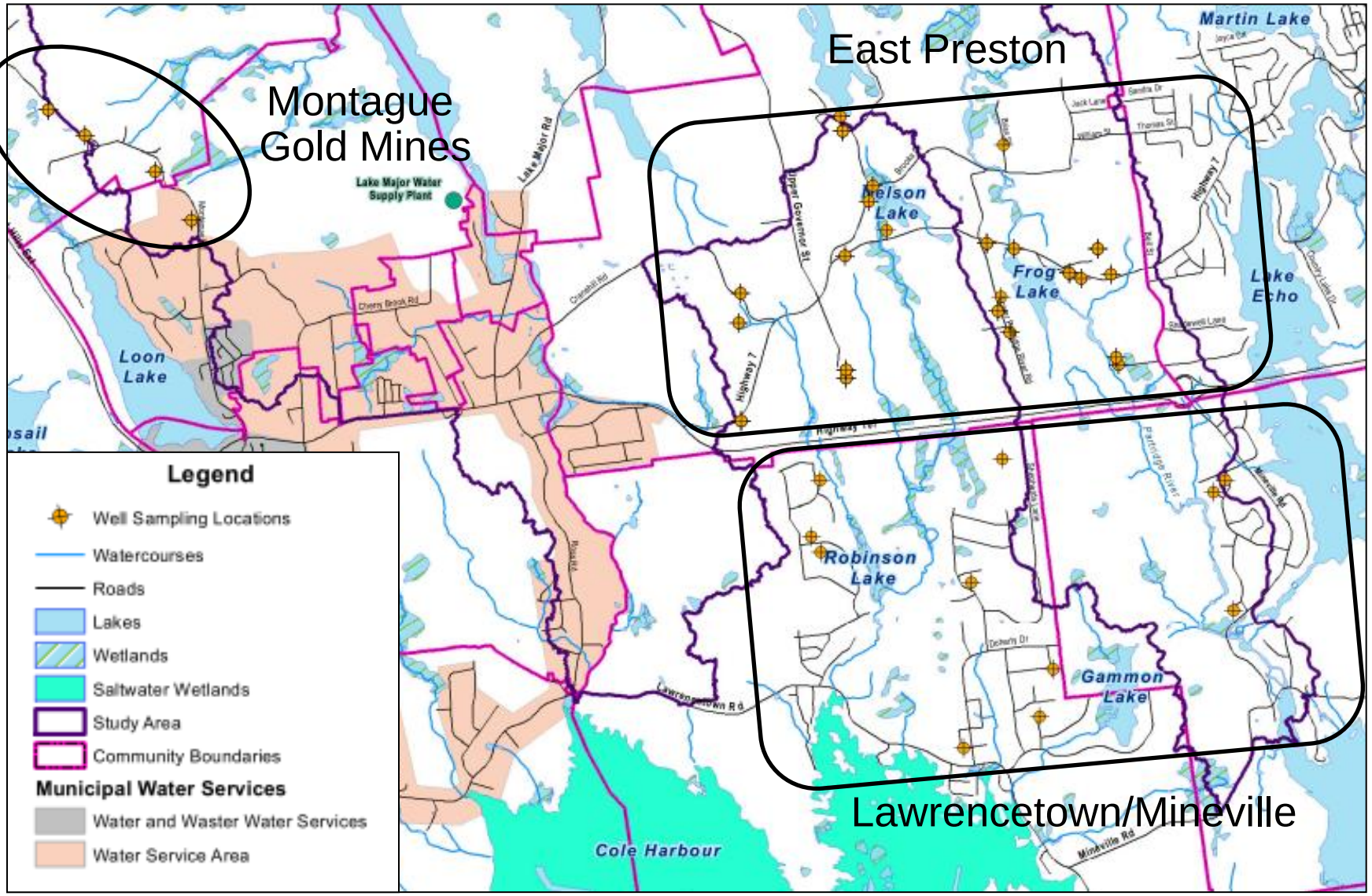
Additional Lake Sampling: Total Phosphorus

- Nelson Lake
  - May 2014: 24 µg/L
  - July 2014: 16 µg/L
- Robinson Lake
  - May 2014: 22 µg/L
  - July 2014: 18 µg/L
- Gammon Lake
  - May 2014: 21 µg/L
  - July 2014: 16 µg/L



Preston Residential Well Survey



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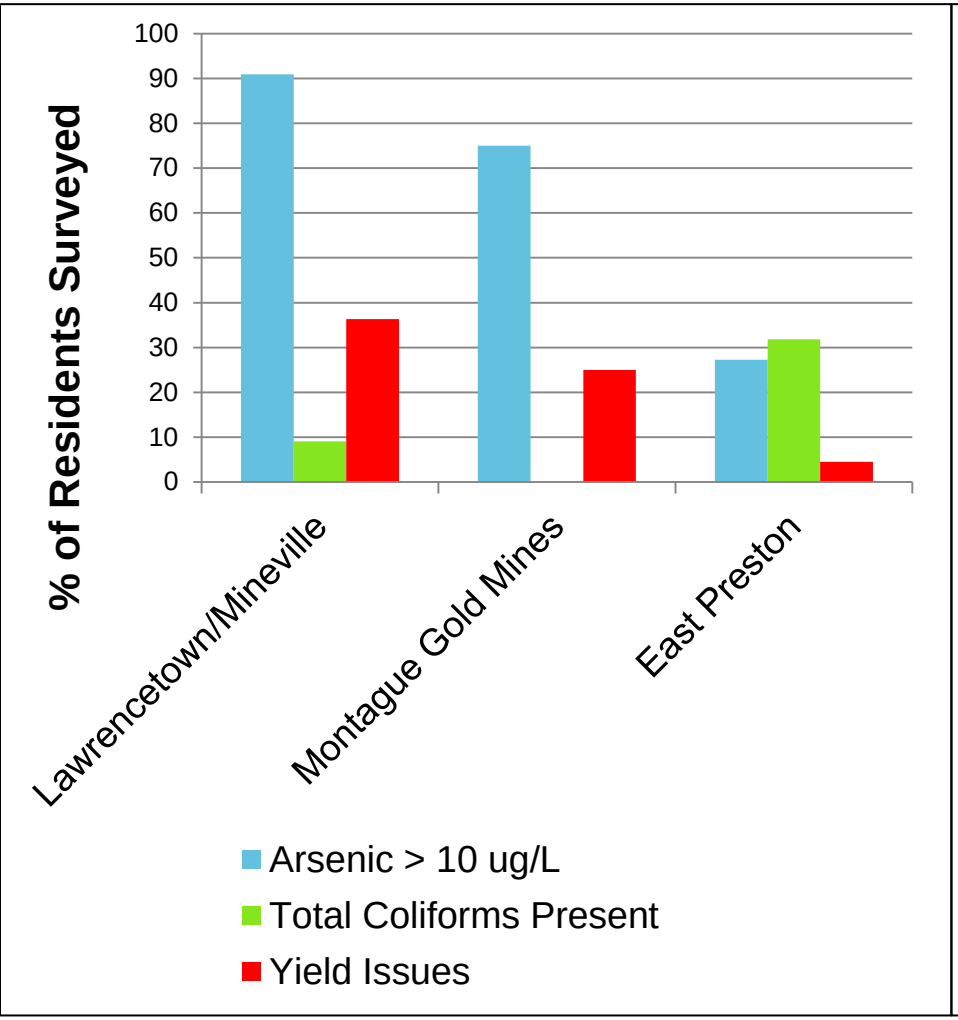
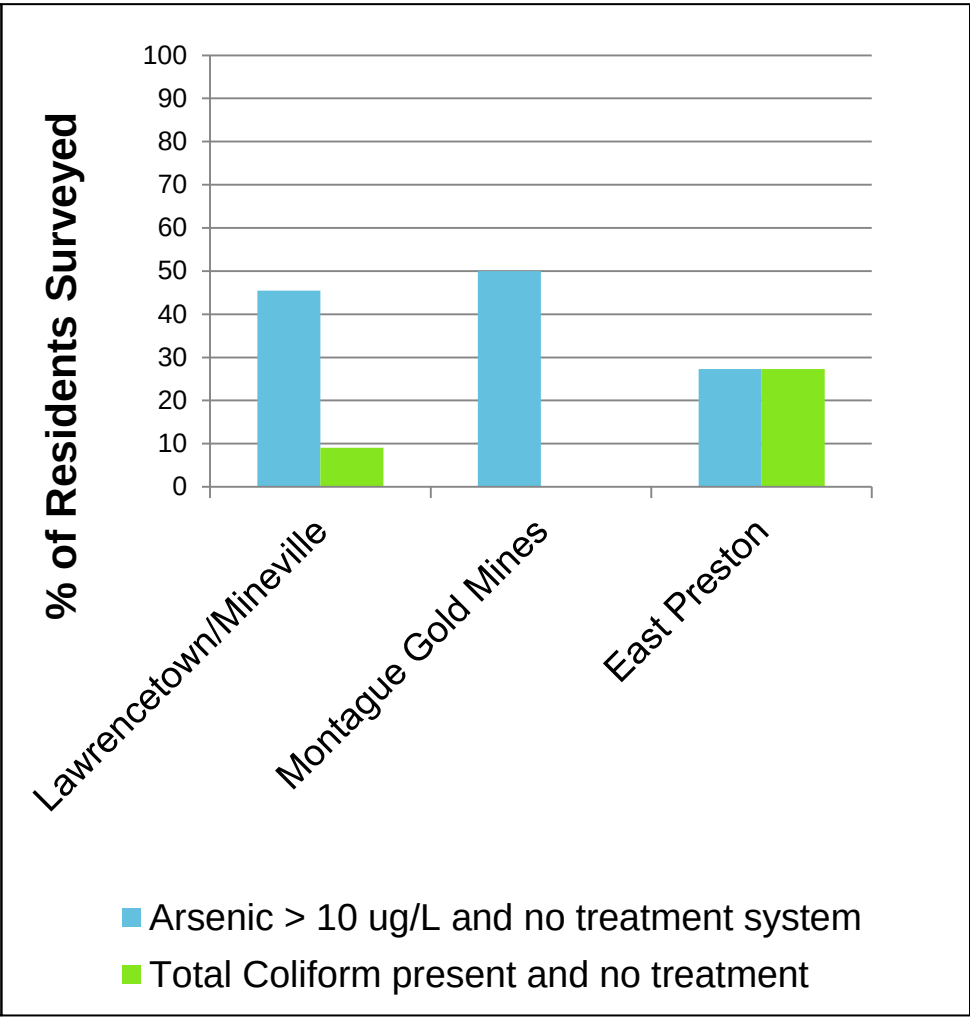
Preston Area residential well results summary

- Dug wells
  - Total Coliform
    - Potential health concern
  - Yield issues on hills in summer
- Drilled wells
  - Arsenic >10 µg/L (CDWQ guideline
    - Potential health concern
  - Yield issues variable and difficult to predict

Iron, manganese and chloride common

Preston residential well results summary





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Preston Area Technical Summary

- Salmon River watershed water quality is generally low in nutrients
  - Oligotrophic to mesotrophic
- Partridge River watershed water quality is moderate to high in nutrients
  - Mesotrophic to eutrophic
- Groundwater Quality
  - Arsenic in drilled wells
  - Total Coliform in dug wells

Preston Area Community Comments

- Presentations to the Community
  - Study introduction: September 2013
  - Preliminary report: December 2013
  - Final report: September 2014
- Regional Watershed Advisory Board
  - Preliminary report: February 2014
  - Final report: September 2014
- Comments documented in Final Report

Preston Area Community Comments

- Surface water quality
  - Concerns about the impacts of the North Preston WWTF on lake water quality
- Groundwater quality
  - Health concerns
- Development plans
  - Concerns that development will occur that may have negative impacts on the fabric of the community

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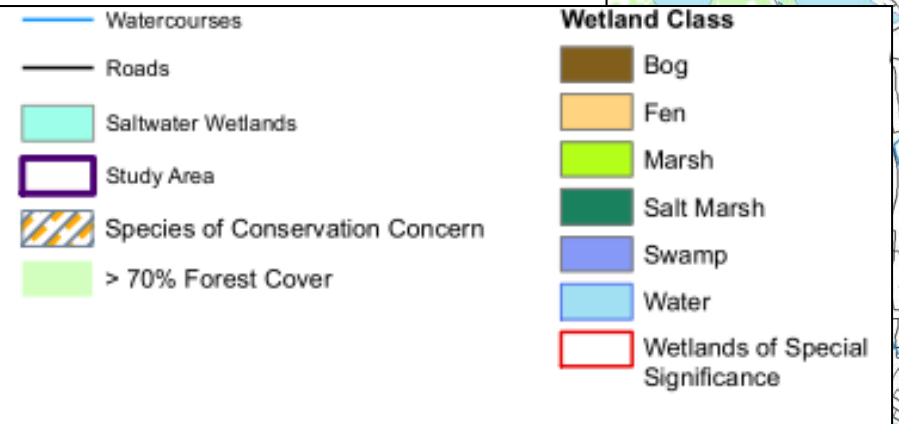
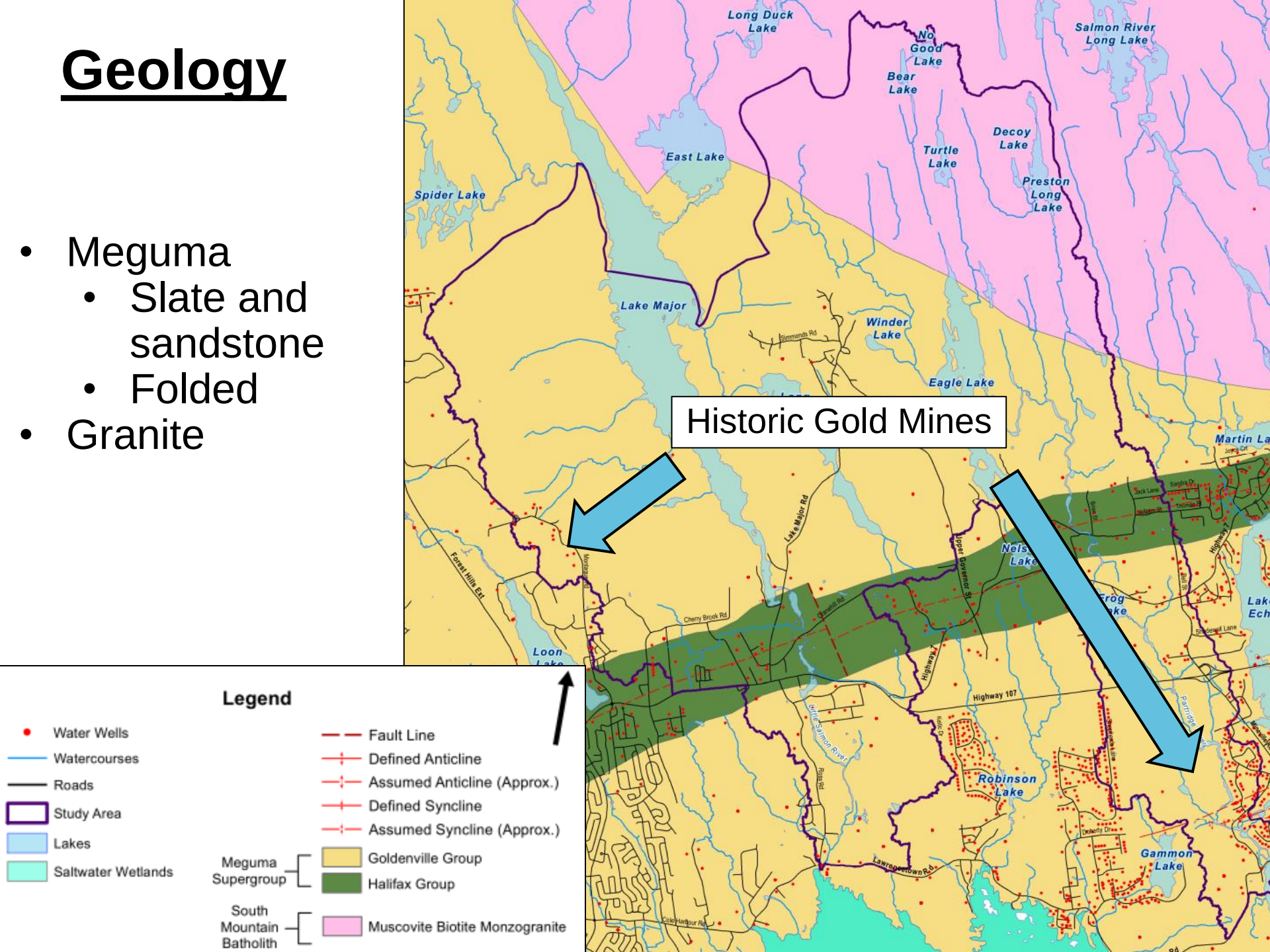
Ecology

- Forested Areas
- Wetlands
- Birds
  - 19 species of conservation concern



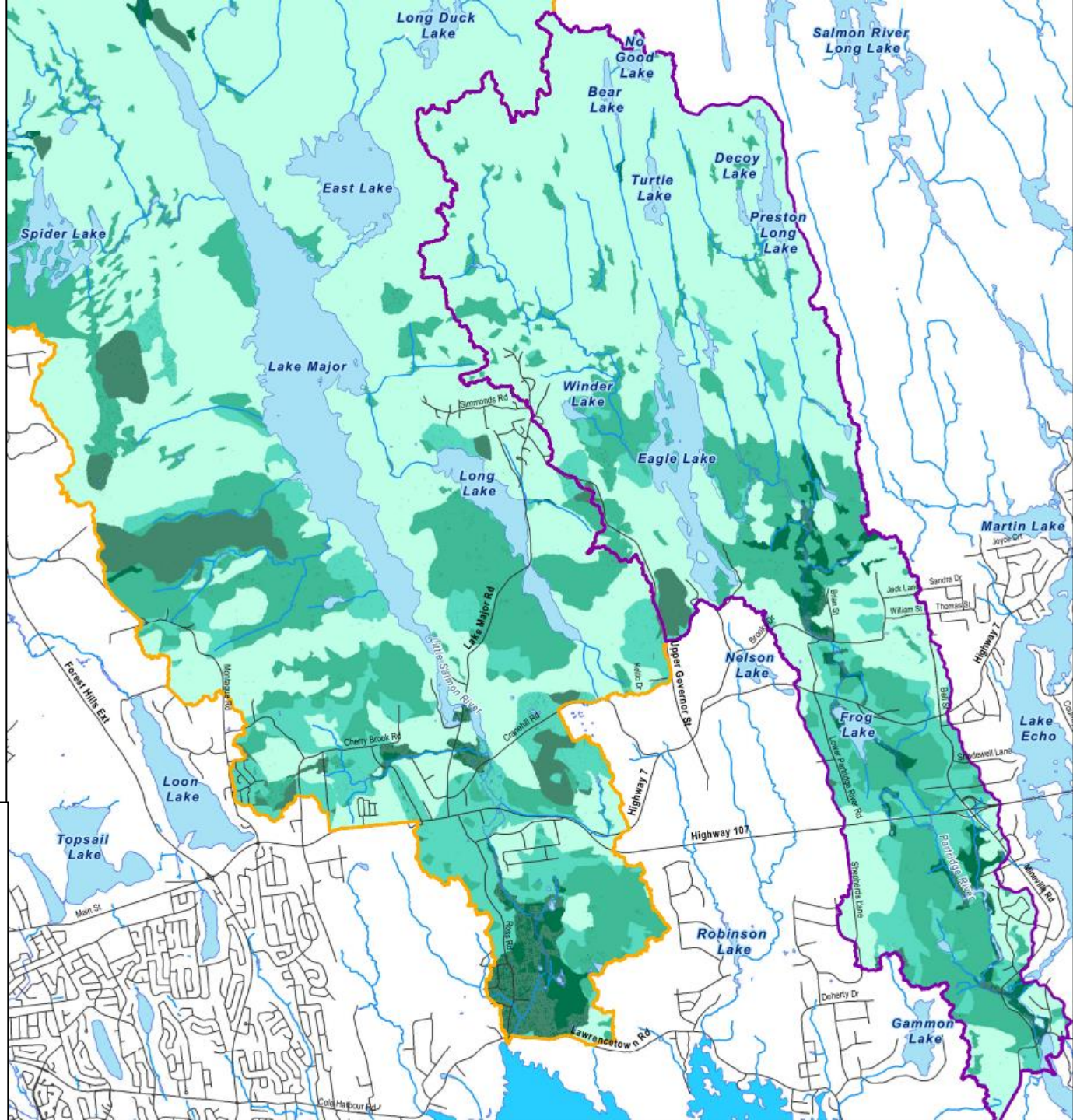
Geology

- Meguma
  - Slate and sandstone
  - Folded
- Granite



Groundwater Recharge

- Coarse grained soils
  - Higher recharge



Establishing Surface Water Quality Objectives

- Evaluate existing water quality data
- Compare to guidelines
- Recommend water quality objectives
  - Upper limit of water quality concentrations
- Specific for each lake

Sensitive to potential impacts from land use changes

- Total Phosphorus
- Nitrate
- Ammonia
- Total Suspended Solids
- Chloride
- *E. coli* bacteria

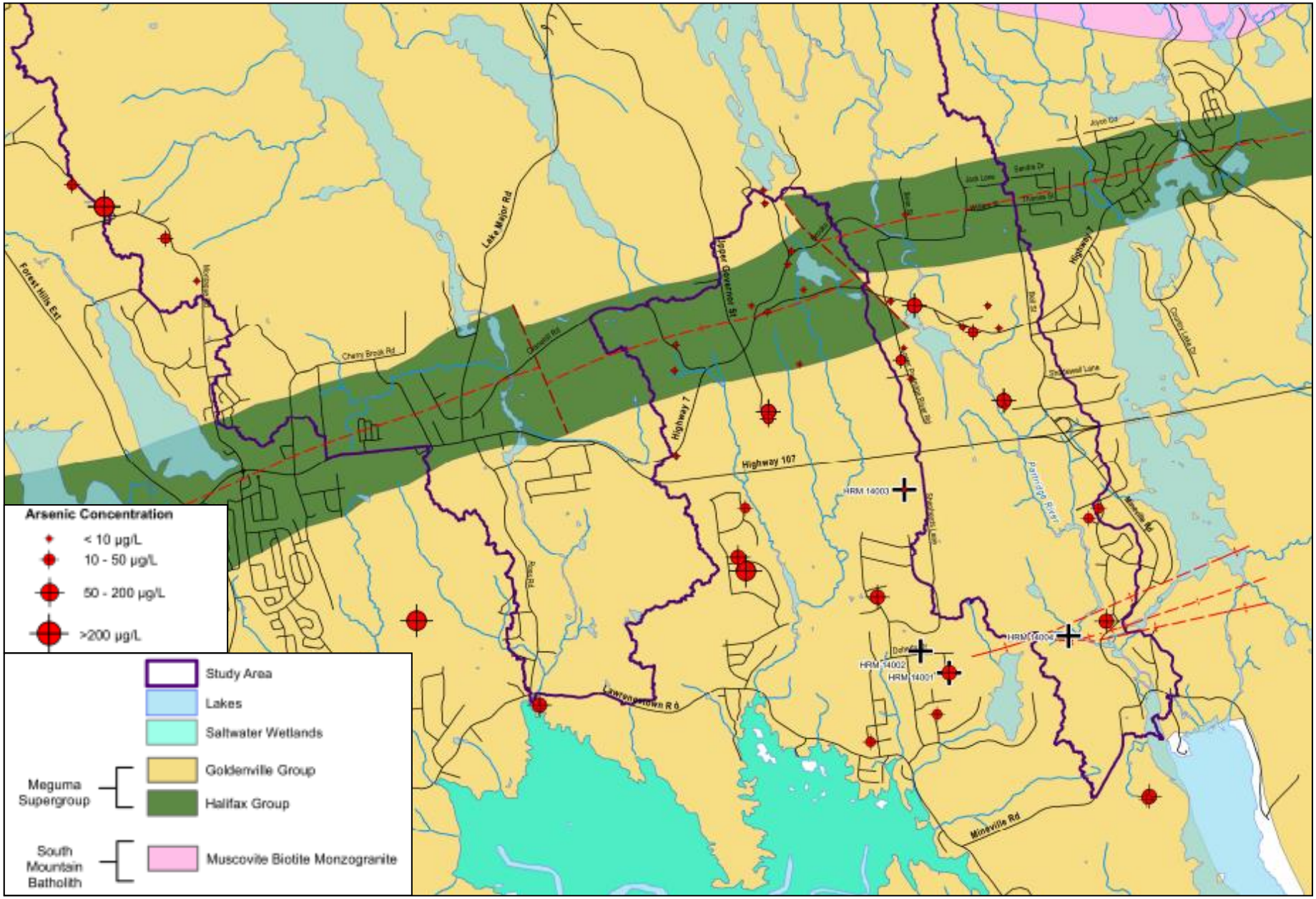
Groundwater Issues

- Historic information
  - Hydrogeology studies
  - Publically available data
  - Geology
- Residential well survey
  - Well water samples
  - Questionnaire
  - Sampled 1 or 2 times per well

Evaluate water quality and quantity

- Issues of health concern
- Water supply

Arsenic in Groundwater



Montague Gold Mines

- 4 drilled wells sampled
- Arsenic
  – 2 to 250 µg/L
- Iron
- Manganese
- Chloride

Artist: Joseph Purcell, ‘Montague’

East Preston

- 16 Drilled wells sampled
- Arsenic
  - < 2 to 60 µg/L
  - Above 10 µg/L in 4 out of 16 wells (25%)
- Iron and manganese

Well yield/Quantity

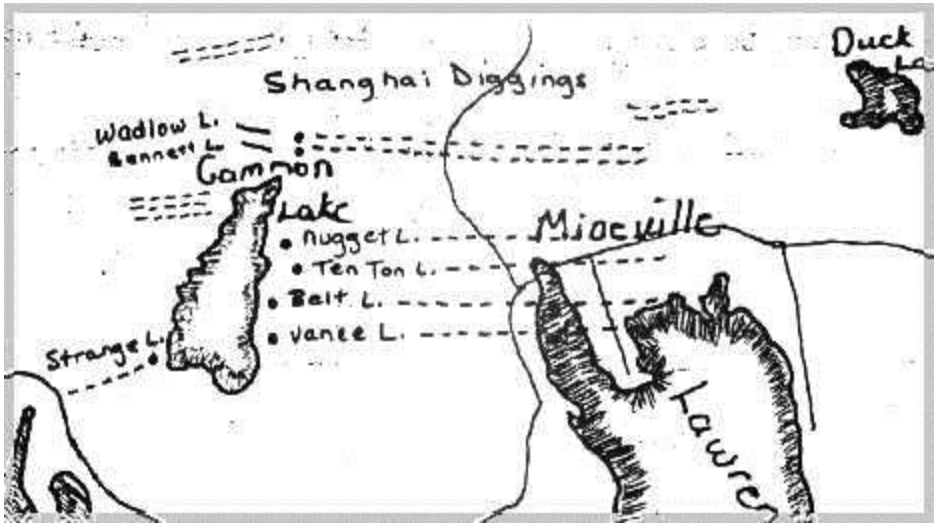
- 1 out of 22 wells

- 6 Dug wells sampled
- Total coliform
  - Not present to 2420 mpn/100 mL
  - Present in 6 out of 6 wells
  - Indicates pathway present for harmful bacteria or other surface contaminants

Lawrencetown/Mineville

- 11 Drilled wells sampled
- Arsenic
  - < 2 to 577 µg/L
  - Above 10 µg/L in 10 out of 11 wells (91%)
- Iron and Manganese
- Yield/Quantity issues in 4 out of 11 wells (36%)

- Historic Gold mining area



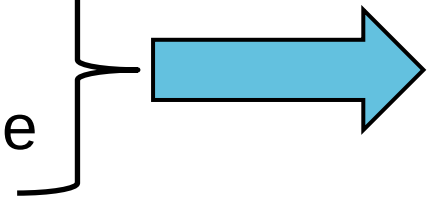
From 'The history of Lawrencetown' by Terry Degen at www.mineville.ca/L4-histgold.html

Groundwater Issues Identified

- **Drilled wells**
  - Arsenic → Health Concern
    - Canadian drinking water quality guideline **10 µg/L**
  - Iron
  - Manganese → Staining, pipe corrosion
  - Yield Issues
    - Variable and difficult to predict

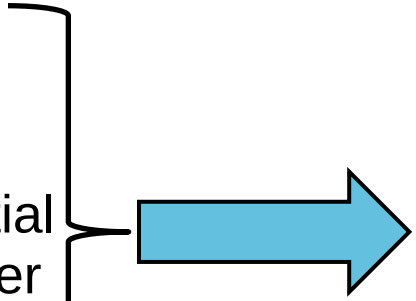
Groundwater Issues Identified

- **Dug wells**
  - Chloride
    - Road salts
  - Iron and manganese



Staining and Corrosion

  - Total Coliform
    - Bacteria
    - Presence indicates potential for harmful bacteria to enter well
  - Arsenic
  - Yield Issues – on hills



Health Concern